SERVICE MANUAL

(without price)

ELECTRONIC CASH REGISTER OPTION I/O BOARD

I/O-PB-11 (EX-I/O-PB-11)

NOV. , 1994

FOR MODEL:
CE-4700
TK-1300
TK-2300
TK-2700
TK-5100

INDEX

CASIO®

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IN/ON-LINE BOARD I/O-PB-11

1. TO INSTALL THE I/O-PB-11 (for model CE-4700, TK-1300, TK-2300, TK-2700, TK-5100)

1) Plug off the AC cord from outlet and turn the mode switch to REG mode for discharge of electrolytic capacitors.

2) Open the upper case and remove the Ni-cd battery connector. To open upper case, refer section 8 of disassembly in each ECR service manual.

3) In case of using scale, cut off the masking cover for scale.

4) Replace the ROM for necessary version.

5) Mount necessary RAM chips to main PCB.

6) Mount the two locking supporters on the PCB.

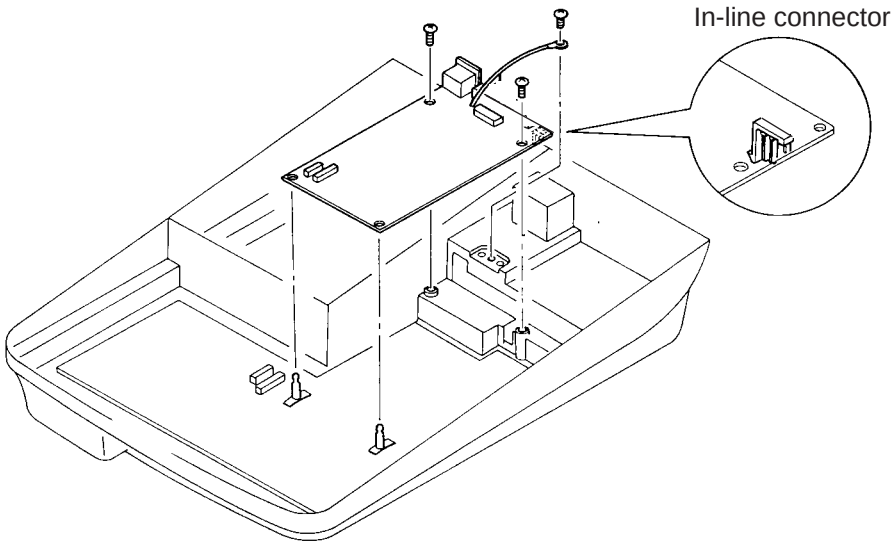
7) Connect the I/O-PB-11 and main PCB by two cables carefully caused the cable lines are very narrow.

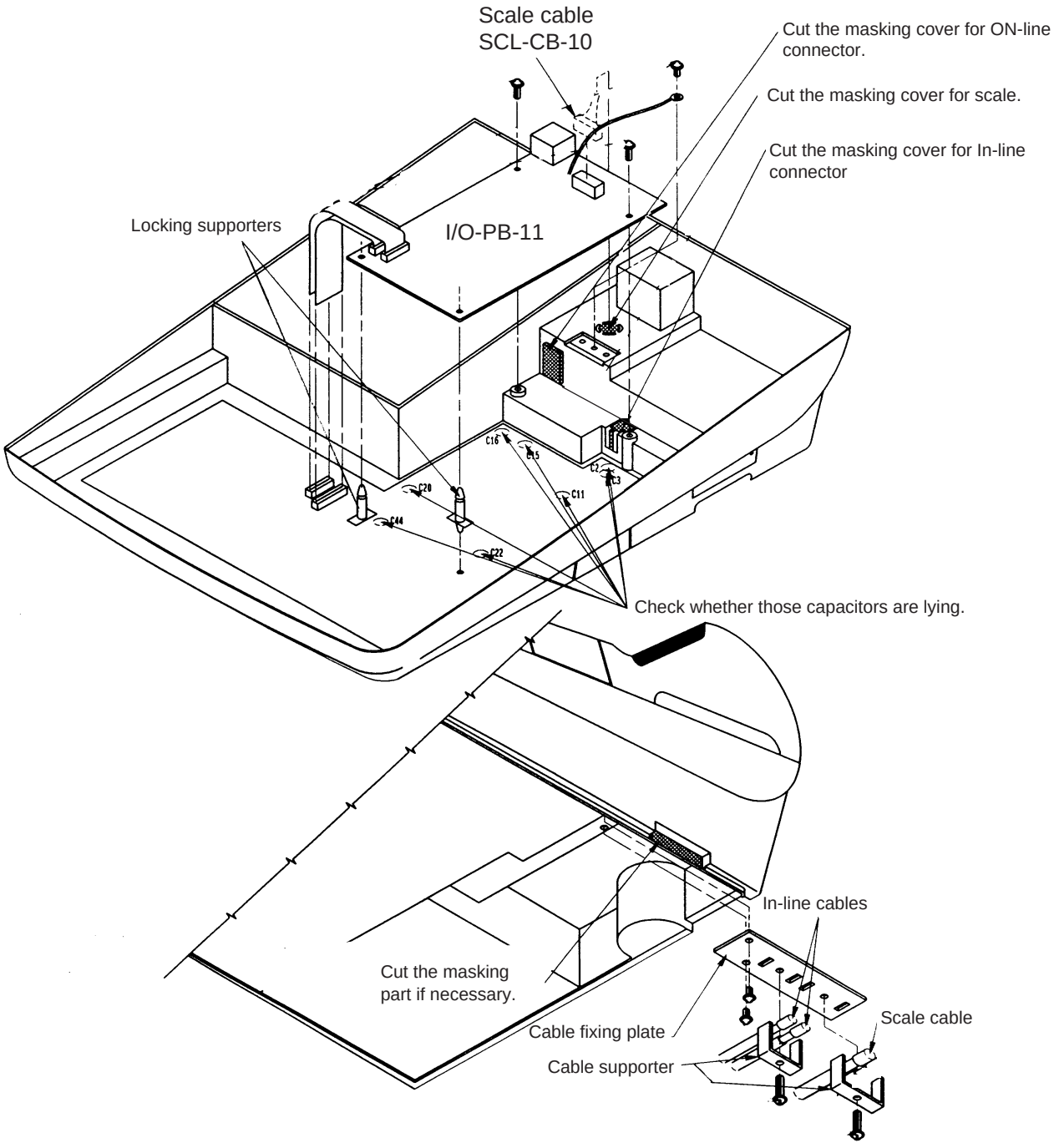
8) Connect the F.G. wire of I/O-PB-11 to the F.G. plate by screw.

9) Connect the Ni-cd battery connector to the main PCB.

10) Perform the MAC operation and check whether the machine is normal condition.

11) Power off and close the upper case by screw.




Scale cable
SCL-CB-10
Cut the masking cover for ON-line connector.
Cut the masking cover for scale.
Cut the masking cover for In-line connector
Locking supporters
I/O-PB-11
C16
C15
C2
C3
C20
C11
C44
C22
Check whether those capacitors are lying.
In-line cables
Cut the masking part if necessary.
Cable fixing plate
Scale cable
Cable supporter

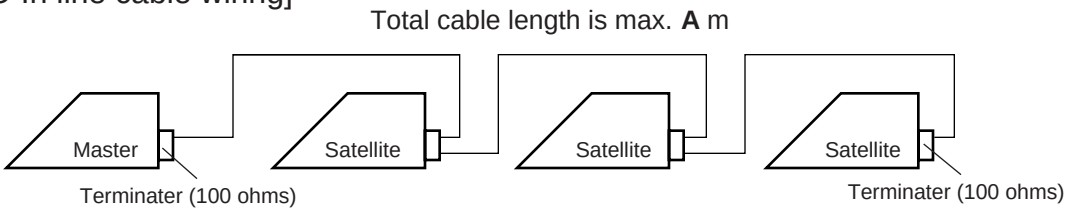
2. INTERFACE

2-1. C-In line (ECR to ECR)

1) C-In line connection diagram

The maximum C-In line cable length and the maximum connection unit will be varied by the in-line communication speed as shown below list.

[C-In line cable wiring]



C-In line communication speed (Baud rate)	Maximum connection unit	Maximum cable length **A** (m)
1.25 M bps	8	86
625 K bps	12	200
312.5 K bps	20	430
156.25 K bps	32	890

2) C-In line cable, Connector, and Terminater

C-In line cable

Code No.	Parts name	Specification
1904 4023	In-line cable	IPEV-SLA0.5x1P

C-In line connector

Code No.	Parts name	Specification
3500 5820	In-line connector kit	XLP-KIT-1

Terminater

Code No.	Parts name	Specification
2600 2516	Carbon film resistor	R-25-100-J

3) Cable connection diagram

Signal	Pin
SD	1
RD	2
FG	FG plate

(Master side)

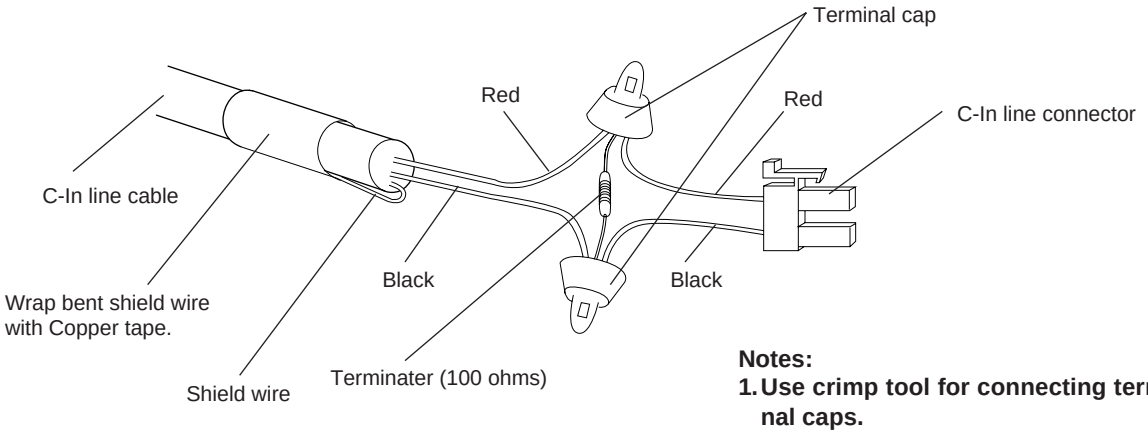
Signal	Pin
SD	1
RD	2
FG	FG plate

(satellite side)

4) To fix C-In line connector to ECR.

Connect the C-In line cable and C-In line connector as shown below:

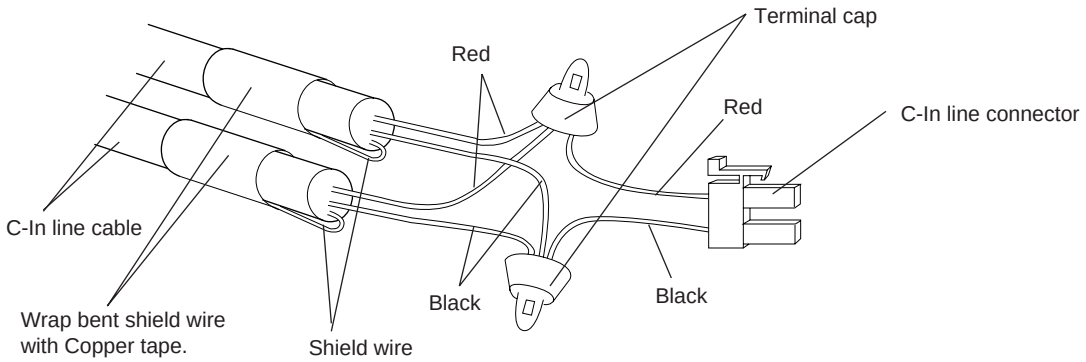
[Connector on the end of C-In line]



Notes:

1. **Use crimp tool for connecting terminal caps.**
2. **If crimp tool is not available, connect the wires with solder instead of terminal cap. After the soldering, insulate the wires with vinyl tape.**

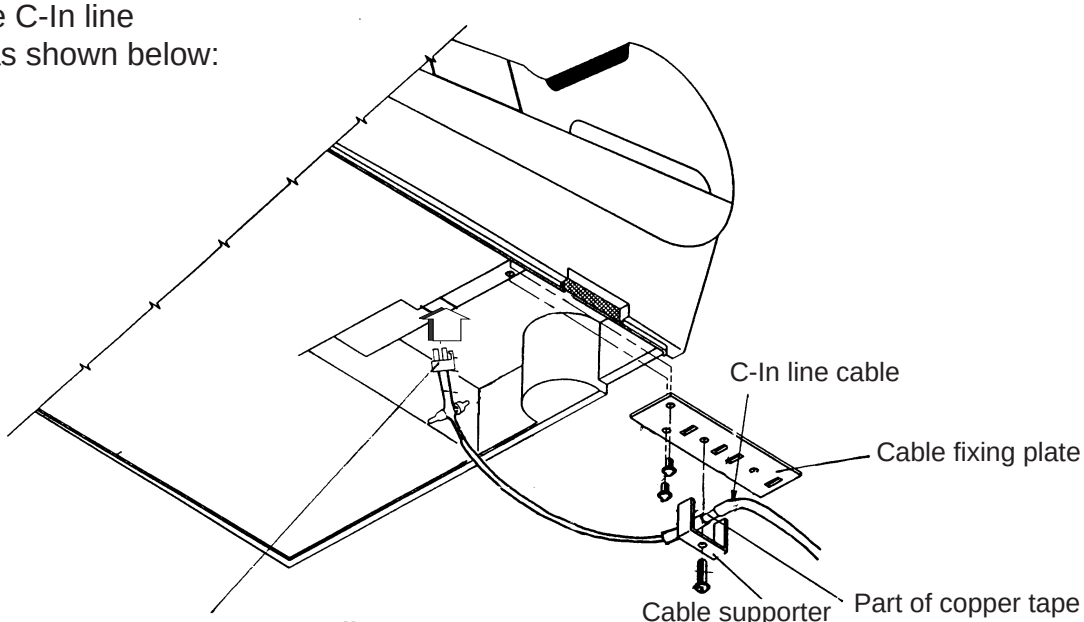
[Connector between ECRs]



Notes:

1. **Use crimp tool for connecting terminal caps.**
2. **If crimp tool is not available, connect the wires with solder instead of terminal cap. After the soldering, insulate the wires with vinyl tape.**

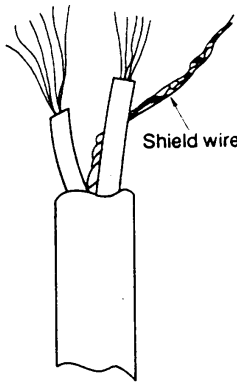
Connect the C-In line connector as shown below:



6) C-In line cable specification

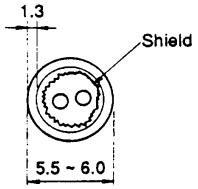
1. Structure

Conductor	Material:	Tin plated mild copper twist
	Cross section area:	0.5mm^2
	Construction:	20 pieces/0.18 mm
	O.D.	0.95 mm
Insulation	Material:	Polyethylene
	Thickness	0.3 mm
Sheath	Material:	PVC
	Thickness	1.3 mm
Finished O.D.:		6.0 ~6.5 mm
Approx. weight:		55 kg/km



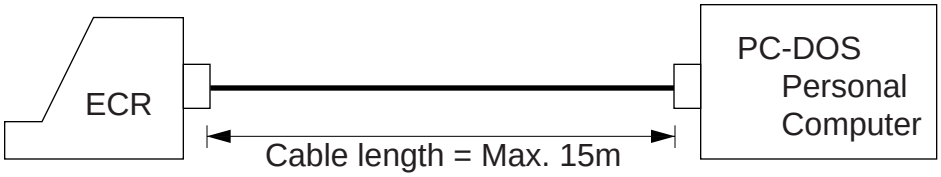
2. Properties (20°C)

Maximum conductor resistance	38.7 Ω/km
Minimum insulation resistance	10 kMΩ•km
Electric strength	AC350 V/1 minute
Electrostatic capacity (Standard)	75 nF/km

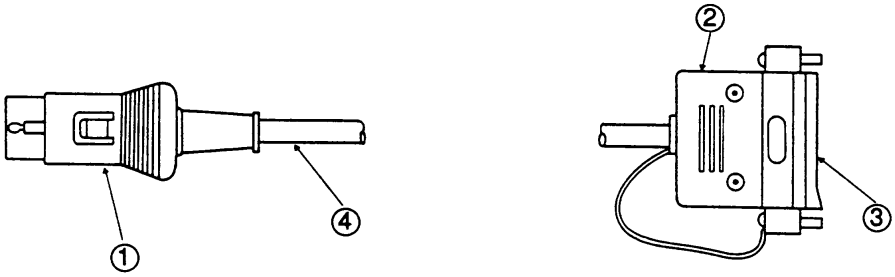


2-2. On line

(1) Direct connection to P/C



[Cable]



1) Wiring diagram (A) A SYNC.

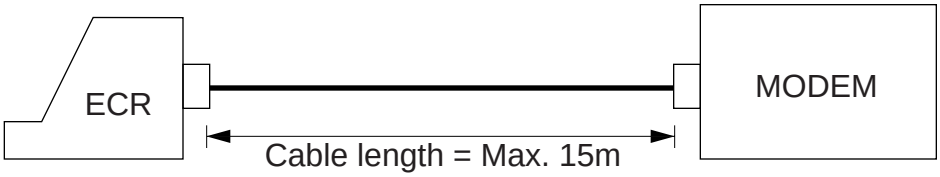
SIGNAL	PIN
GND	1
ER	3
SD	4
RS	5
RD	7
CS	8
CD	9
DR	10
CI	13

PIN	SINGNAL
2	SD
3	RD
4	RS
5	CS
6	DR
7	SG
8	CD
20	ER

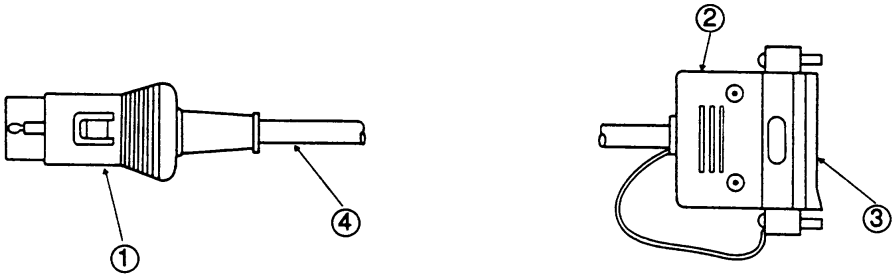
2) Parts list

No.	Code Number	Part	Specification
1	3612 0762	DIN 13P PLUG	TCP9361-71-111
2	3513 1019	Junction shell	DB-C2-J9
3	3510 2043	Shell connector	DB-25S
4		Cable	PLGW-3456-01A

(2) MODEM connection



[Cable]



1) Wiring

SIGNAL	PIN
GND	1
ER	3
SD	4
RS	5
NC	6
RD	7
CS	8
CD	9
DR	10
NC	11
NC	12
CI	13

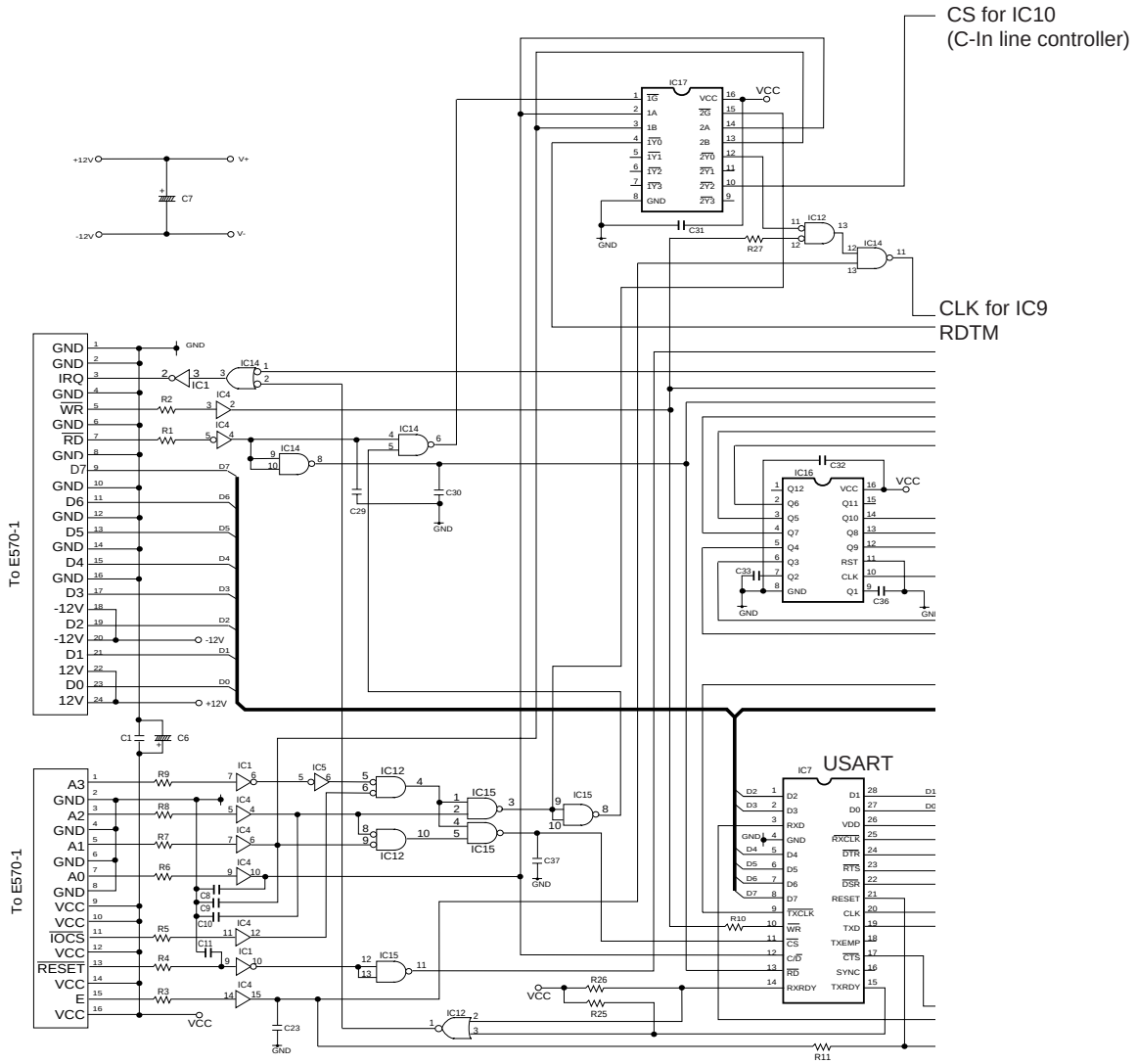
PIN	SINGNAL
2	SD
3	RD
4	RS
5	CS
6	DR
7	SG
8	CD
15	–
17	–
20	ER
22	CI
24	–

2) Parts list

No.	Code Number	Part	Specification
1	3612 0762	DIN 13P PLUG	TCP9361-71-111
2	3513 1019	Junction shell	DB-C2-J9
3	3510 2043	Shell connector	DB-25S
4		Cable	PLGW-3456-01A

3. CIRCUIT EXPLANATIONS

3-1. Address selection

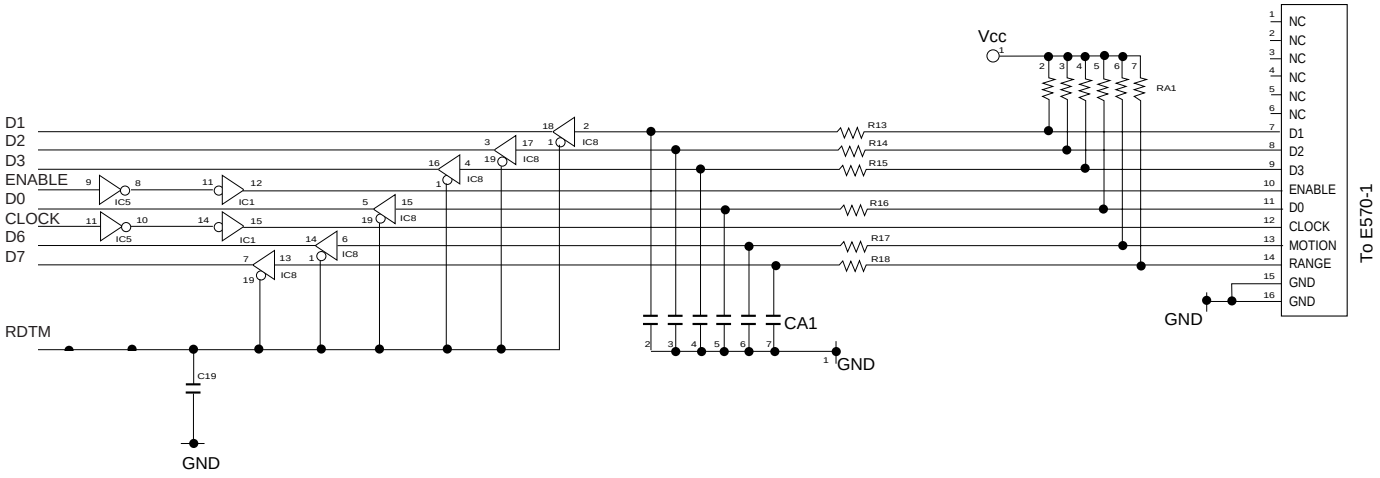


According to the address of main CPU, the decorder selects the following optional devises.

IC No.	Pin No.		CPU address	Descriptions
IC17	4	$\overline{1Y0}$	0034H & RD="L"	RDTM gate enable of IC8 (For scale data read)
	10	$\overline{2Y2}$	0036H	Chip selection of C-In line controller
IC14	11	$\overline{CLK}$	0034H & WR="L"	Clock signal of IC9 (For C-In line controller data)
IC15	6	$\overline{CS}$	0030H	Chip selection of USART (Data)
			0031H	Chip selection of USART (Control status)

3-2. Scale buffer circuit

When a measured object is put on the scale, the scale starts weighing. During weighing, MO signal is "H". When the weighing is finished with indication of the weight of measures object, the MO signal becomes "L".
Then EN signal is output to the scale and the scale output the weight data (D0~D3) to the scale buffer.



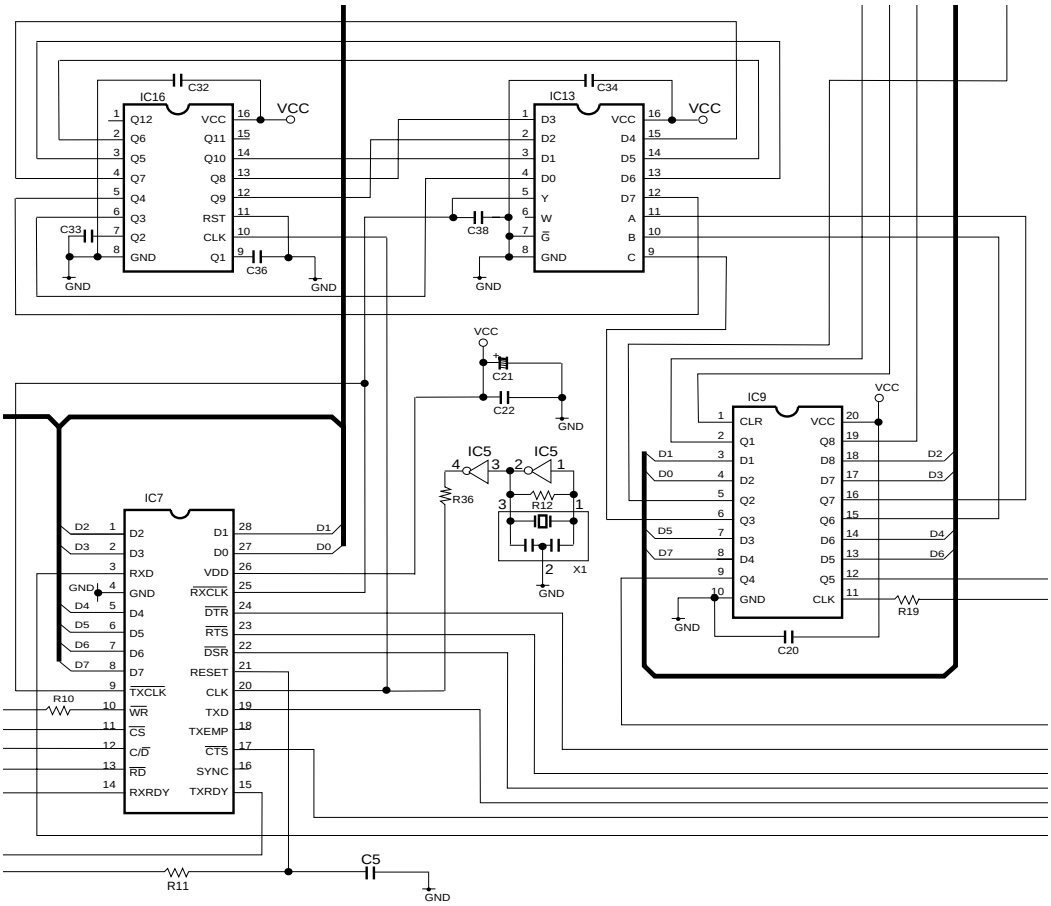
Pin description of scale connector

Pin No.	Signal Name	Descriptions
1	NC	Non connection
2	NC	Non connection
3	NC	Non connection
4	NC	Non connection
5	NC	Non connection
6	NC	Non connection
7	D1	Data
8	D2	Data
9	D3	Data
10	ENABLE	Enable signal
11	D0	Data
12	CLOCK	Clock signal
13	MOTION	Motion signal
14	RANGE	Out of range signal
15	GND	GND
16	GND	GND

3-3. On line circuit (RS-232C)

1. Baud rate selection for On line (RS-232C)

Basic clock (307.2 KHz) is divided into seven clocks by binary counter IC16 and they are supplied to D0~D6 terminals of multiplexer IC13. The IC13 outputs one clock to USART according to the condition of select signals A, B, and C.



Output of IC16

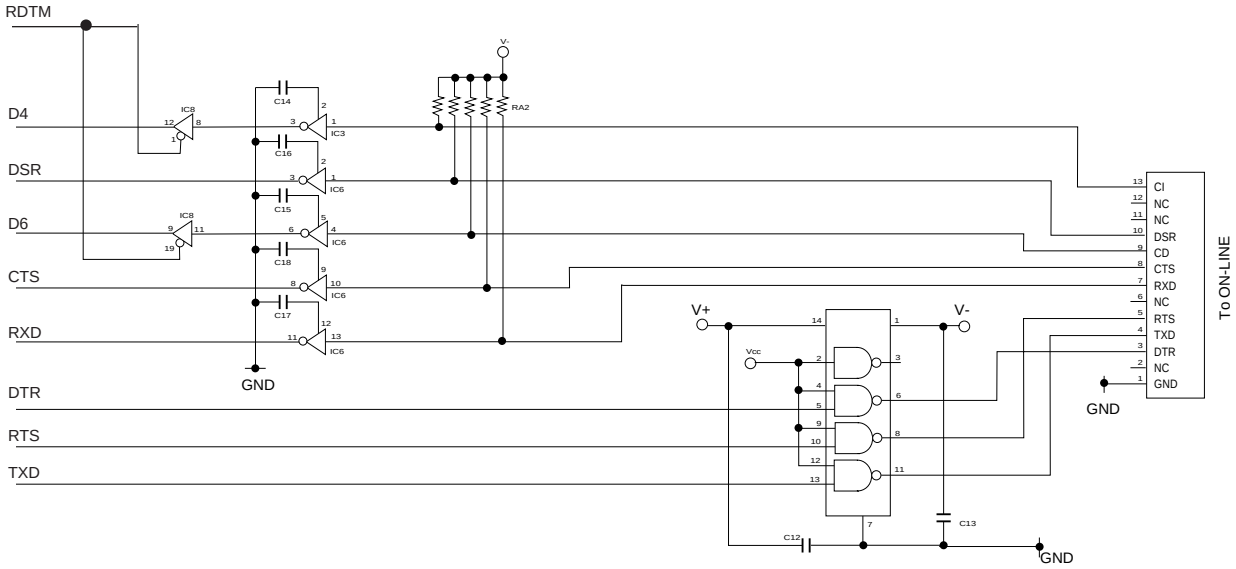
Q3	38.4 K
Q4	19.2 K
Q5	9,600
Q6	4,800
Q7	2,400
Q8	1,200
Q9	600
Q10	300

Truth table of IC13

Input			Output
A	B	C	Y
L	L	L	D0
H	L	L	D1
L	H	L	D2
H	H	L	D3
L	L	H	D4
H	L	H	D5
L	H	H	D6
H	H	H	D7

2. On line circuit (RS-232C)

The on line port (RS-232C) is controlled by the USART μPD71051 and supported only asynchronous communication.



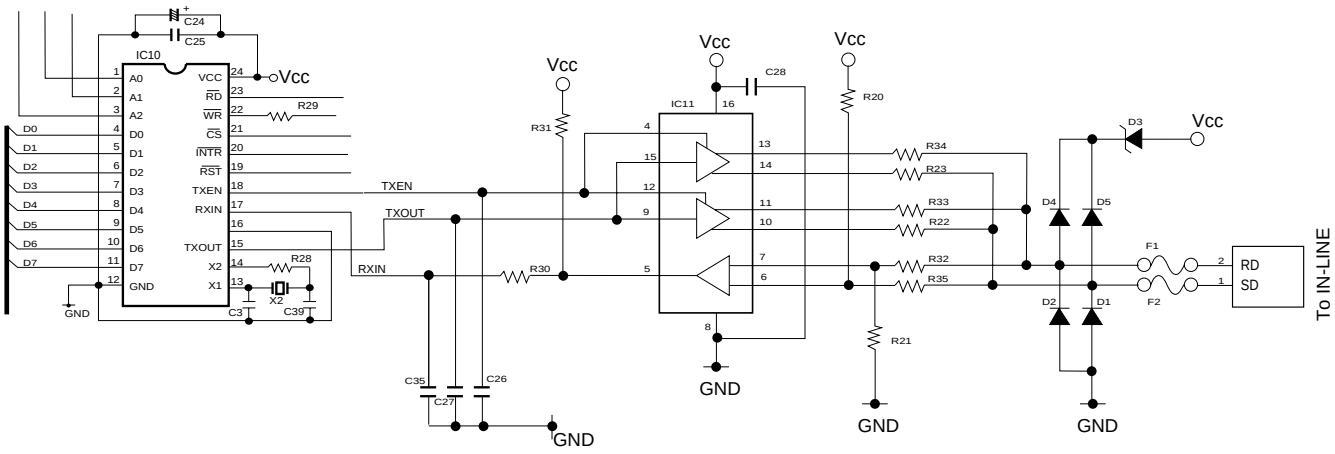
Pin description of UPD71051C

Pin No.	Signal	Description
1,2,5~8, 27,28	D0~D7	Data bus
3	RxDATA	Receive data input
9	TxCLK	Transmitter clock input
10	WR	Write signal
11	CS	Chip select signal Input
12	C/D	Control or data change
13	RD	Read signal
14	RxRDY	Receive ready output
15	TxRDY	Transmittor ready output
16	SYNC/BRK	Syncronization/Break (Not used)
17	CTS	Clear to send signal input
18	TxEMP	Transmitter empty
19	TxDATA	Transmit data output
20	CLK	Clock input
21	RESET	Reset input
22	DSR	Data set ready signal input
23	RTS	Request to send signal output
24	DTR	Data terminal ready signal output
25	RxCLK	Receiver clock input
26	VDD	VCC(+5V) terminal

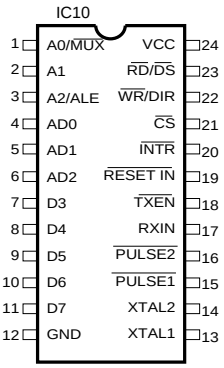
Pin description of on line connector

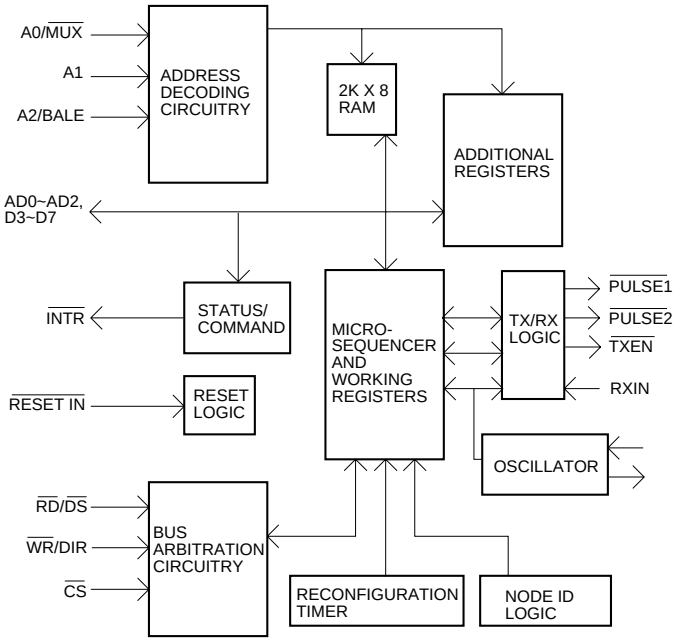
Pin No.	Signal	Description
1	SG	Signal ground
2	NC	Non connection
3	ER	Equipment ready
4	SD	Send data
5	RTS	Request to send
6	NC	Non connection
7	RD	Receive data
8	CTS	Crear to send
9	CD	Carrier detect
10	DR	Data ready
11	NC	No connection
12	NC	No connection
13	CI	Calling indicator

3-4. C-In line circuit



1. C-In line controller (COM20020B)





2. COM20020B pin description

Pin No.	Name	In/Out	Status of OFF	Status of ON No Token	Status of ON Token	Description
1 2 3	A0/$\overline{MUX}$ A1 A2/ALE	In In In	L L L	L L L	Pulse L L	Input. On a non-multiplexed bus, these signals are dirctly connectoed to the low bits of the host address bus. On a multiplexed address/data bus, A0/MUX is tied low, A1 is left open, and A2 is tied to the address latch enable signal of the host. A1 is connectoed to an internal pull-up resistor.
4 5 6 7 8 9 10 11	AD0 AD1 AD2 D3 D4 D5 D6 D7	In/Out In/Out In/Out In/Out In/Out In/Out In/Out In/Out	L L L L L L L L	Pulse Pulse Pulse Pulse Pulse Pulse Pulse Pulse	Pulse Pulse Pulse Pulse Pulse Pulse Pulse Pulse	Input/Output. On a non-multiplexed bus, these signals are used as the data lines for the device. On a multiplexed address/data bus, AD0~AD2 act as the address lines (latched by ALE) and as the low data lines for the device. D3~D7 are always used for data only. These signals are connected to internal pull-up resistors.
12	GND	Power	GND	GND	GND	Signal ground.
13 14	XTAL1 XTAL2	In In	L L	Pulse Pulse	Pulse Pulse	An external crystal shoul be connected to these pins. If an external TTL clock is used instead, it must be connected to XTAL1 with a 390 ohms pull-up resistor, and XTAL2 should be left floating.
15 16	$\overline{PULSE1}$ $\overline{PULSE2}$	Out Out	L L	H L	Pulse L	Output. In normal mode, these active low signals carry the transmit data information, encoded in pulse format, from the COM20020 to the media driver circuitry. When the device is in backplane mode, the PULSE1 signal driver is programmable (push/pull or open-drain), while the PULSE2 signal provides a clock with frequency of crystal/4. PULSE1 is connected to a week internal pull-up resistor in backplane mode.
17	RXIN	In	L	H	Pulse	Receive input. This signal carries the receive data information from the line receiver circuitry to the COM20020.
18	$\overline{TXEN}$	Out	L	L	Pulse	Transmit Enable output. This signal used in backplane mode to enable the line drivers for transmission. The polarity of the signal is programmable by grounding the PULSE2 pin. This option is valid only in backplane mode.
19	$\overline{RESET\ IN}$	In	L	H	H	Input. This active low signal issued by the microcontroller executes a hard-ware reset. It is used to activate the internal reset circuitry within the COM20020.

Pin No.	Name	In/Out	Status of OFF	Status of ON No token	Status of ON Token	Description
20	$\overline{INTR}$	Out	L	H	Pulse	Interrupt output. This active low signal is generated by the COM20020 when an enabled interrupt condition occurs. INTR returns to its inactive state when the interrupt status condition or the corresponding interrupt mask bit is reset.
21	$\overline{CS}$	In	L	H	Pulse	Chip select input. This active low signal issued by the microcontroller selects the COM20020 for an access.
22	$\overline{WR}$/DIR	In	L	Pulse	Pulse	Input. On a 68XX-like bus, this signal is issued by the microcontroller as the Read/Write signal to determine the direction of data transfer. In this case, a logic "1" selects a read operation, while a logic "0" selects a write operation. In this case, data is actually strobed by the DS signal. On an 80XX-like bus, this active low signal is isuued by the microcontroller to indicate a write operation. in this case, a logic "0" on this pin, when the COM20020 is accessed, enables data from the data bus to be written to the device.
23	$\overline{RD}$/$\overline{DS}$	In	L	L	Pulse	Read/ Data strobe signal input. On a 68XX-like bus, this active low signal is issued by the microcontroller as the data strobe signal to strobe the data onto the bus. On a 80XX-like bus, this active low signal is issued by the microcontroller to indicate a read operation. In this case, a logic "0" on this pin, when the COM20020 is accessed, enables data from the device to the data bus to be read by the microcontroller.
24	VCC	Power	GND	+5V	+5V	Power supply +5V.

4. DIAGNOSTIC OPERATIONS

4-1. To start the diagnostic operation

START

Set mode switch to OFF mode.

While pressing the feed key, turn the mode switch to PROGRAM.

Release the feed key after 2 seconds. (Display shows all "0".)

Input following 10 digits number.

9 9 9 9 9 0 0 0 0 0 (Fixed value)

Press #2 key (Refer the each service manual for the key location.)

The machine prints initial message and issues the receipt.

To each test operation

The test mode starts by the above operations. And with this operation, the ROM sum check is done automatically and the result is printed on the receipt. To return the normal operation mode, perform the MAC (INIT1) operation.

NOTE: Please refer the each service manual for the following test operations:

1 Numeral keys check (0~9 keys)
2 General keys (All keys except Clear, paper feed, and numeral keys)
3 Switch check
4 I/O Port status check
5 General test (RAM, display, printer, drawer 1, clock, auto cutter)
6 RAM read after write test
7 RAM read only test
8 RAM card read after write test
9 RAM card read only test
10 Display check
11 Time and date test
12 Printer check
13 Slip printer check
14 Centronic printer check
15 Drawer check
16 Auto paper cutter check
17 On line loop back test
18 Scale reading test

4-2. Check Items for I/O-PB-11

1 C-In line ID No. & Baud rate set (High speed in-line talken start command)
2 C-In line test termination (Termination command)
3 C-In line CN (connection) type message transmission test
4 C-In line CN (connection) type message reception test
5 C-In line CL (connection less) type message transmission test
6 C-In line CL (connection less) type message reception test
7 C-In line control chip status check

4-3. Operations

1. C-In line ID No. & Baud rate set (High speed in-line talken start command)

[Operation]

Press [8] [0] [n] [#2] . (whereas n = Machine ID No.)

Press [8] [1] [m] [#2] . (whereas m = Baud rate code)

The baud rate code is as follow:
m = 0; 156.25 K bps. m = 2; 625 K bps.
m = 1; 312.5 K bps. m = 3; 1.25 M bps.

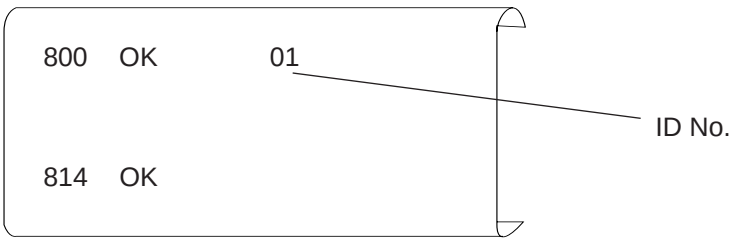
Note 1: To stop the test, perform Termination command.
Note 2: Select ID No. from 1 to 32 for test operation.
Note 3: To set the 2 digits ID No., operate as follows:

Press [8] [0] [0] [#2] .

Press [n] [n] [#1] . (whereas n n = Machine ID No. more than 2 digits.)
ID No. = 10 ~ 32.

Press [8] [1] [m] [#2] . (whereas m = Baud rate code)

[Print sample]



2. C-In line test termination (Termination command)

This command is for the termination of the TOKEN.

[Operation]

Press [8] [2] [0] [#2] .

[Print sample]

820 OK

3. C-In line CN (connection) type message transmission test

This command will check the communication by CN type message. This operaton will compare with transmission data and reception data after sending data to the reception machine.
Before performing this transmission test, set the ID No. & Baud rate by the Item No.1 operation.

[Operation]

Press [8] [3] [n] [#2] . (whereas n = Machine ID No.)
ID No. = 0 ~ 9 (ID No.0 is for the host computer.)
(10~32 are not possible to use.)

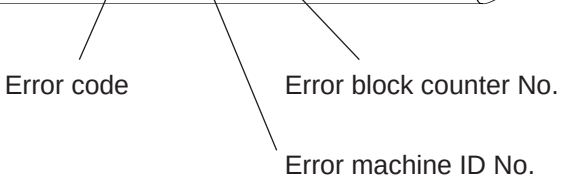
Note 1: To stop the test, press [#2] key.
Note 2: To perform this test, the reception machine is necessary. Before operating this test, perform the CN type receprion command on the reception machine.

[Print sample (Normal end)]

831 OK

[Print sample (Abnormal end)]

831 ER83 01-0000



4. C-In line CN (connection) type message reception test

This command will check the communication by CN type message. This operaton will return the transmission data after reception data without any change.
Before performing this transmission test, set the ID No. & Baud rate by the Item No.1 operation.

[Operation]

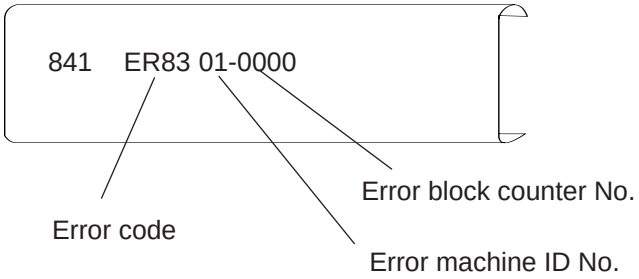
Press [8] [4] [n] [#2] . (whereas n = Machine ID No.)
ID No. = 1 ~ 9(ID No.0 is for the host computer.)
(10~32 are not possible to use.)

Note 1: To stop the test, press [#2] key.
Note 2: To perform this test, the reception machine is necessary.
After operat ing this test, perform the CN type transmission command on the transmission machine.

[Print sample (Normal end)]

841 OK

[Print sample (Abnormal end)]



5. C-In line CL (connection less) type message transmission test

This command will check the communication by CL type message. This operaton will send the data to the all reception machines.
Before performing this transmission test, set the ID No. & Baud rate by the Item No.1 operation.

[Operation]

Press [8] [5] [0] [#2] .

Note 1: To stop the test, press [#2] key.
Note 2: To perform this test, the reception machine is necessary. Before operat ing this test, perform the CL type receprion command on the reception machine.

[Print sample (Normal end)]

850 OK

[Print sample (Abnormal end)]

850 ER83 01-0000

Error code

Error block counter No.

Error machine ID No.

6. C-In line CL (connection less) type message reception test

This command will check the communication by CL type message. This operaton will receive the transmission data.
Before performing this transmission test, set the ID No. & Baud rate by the Item No.1 operation.

[Operation]

Press 8 6 0 #2 .

Note 1: To stop the test, press #2 key.
Note 2: To perform this test, the Transmission machine is necessary.
After operating this test, perform the CL type transmission command on the transmission machine.

[Print sample (Normal end)]

860 OK

[Print sample (Abnormal end)]

860 ER83 01-0000

Error code

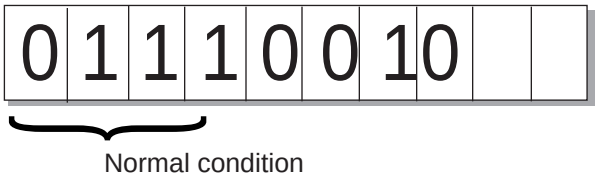
Error block counter No.

Error machine ID No.

7. C-In line control chip status check

This command will check the C-In line control chip status. When the 4 digits of left side are displayed "0111", the C-In line control chip is working normally.

[Display]



8. Diagnostic program error code

Error Code	Nature of error	Function code	Details
01	ROM check sum error	At power on	When the diagnostic program is started up, the last 2 digits of the ROM's check sum is not 00.
02	RAM write error	10	Test data cannot be written in the RAM. (1 byte read after write error)
03	RAM read error	10, 12	Data error at RAM data reading
04	RAM card write error	14	Test data cannot be written in the RAM card. (1 byte read after write error)
05	RAM card read error	14,16	Data error in the RAM card reading check
06	Non connection error of RAM card (ROM card connection)	14	RAM card is not installed. Or, a ROM card is installed in the RAM card test.
10	Abnormal voltage of drawer power.	40	Monitor terminal of drawer PCB receives BUSY signal for more than 1 second.
12	BUSY time out at In-line data transmission	50, 51	Data cannot be sent due to no reception of BUSY signal. (USRT hardware error)
13	In-line receive time out	52, 53	In-line receive test is compulsorily stopped by [#2] key.
14	ON-line transmission BUSY time out	54, 55	Data cannot be sent due to no reception for BUSY signal. (Hardware error)
15	On-line receive time out	55	Cannot receive loop-back data
16	In-line/On-line receive parrity error.	50~55	A parity error in received data
17	In-line/On-line receive framing error	50~55	A framing error in received data
18	In-line/On-line receive data error	50~55	Received data is not correct.
19	On-line CI signal error	54, 55	Poor connection or no connection of loop back connector. Abnormal CI signal.
20	On-line CD signal error	55	Poor connection or no connection of loop back connector. Abnormal CD, RTS lines (On-line 2).
21	On-line DR/CTS signal error	54, 55	Poor connection or no connection of loop back connector. Abnormal CTS (On-line 1), DR (On-line 2).

Error Code	Nature of error	Function code	Details
24	KB-1 time-out error	70	An error occurred during test of KB-1.
25	KB-1 reception error	70	An error occurred while reading data of KB-1.
28	Scale data error	71	An error occurred while reading scale data.
29	Thermal printer board error	36, 37	An error occurred in the thermal printer board.
30	Thermal printer paper out error	36, 37	No paper in the thermal printer.
64 (100)	AUTOPGM or X/Z error	-	A different format data is received.
65 (101)	AUTOPGM or X/Z error	-	A different format of compressed data is selected.
66 (102)	AUTOPGM or X/Z error	-	A received compressed data is abnormal.
67 (103)	AUTOPGM or X/Z error	-	A received compressed data is abnormal.
68 (104)	AUTOPGM or X/Z error	-	Auto program code 90/93 is received from different model.
69 (105)	AUTOPGM or X/Z error	-	Auto program code 90 is received from bigger memory ECR.
6A (106)	AUTOPGM or X/Z error	-	Abort.
6B (107)	AUTOPGM or X/Z error	-	A disk error of PC side.
6C (108)	AUTOPGM or X/Z error	-	A communication sequence is abnormal.
77 (119)	RAM card error	-	A power failue happened during read or write operation.
78 (120)	RAM card error	-	The RAM card door opened during read or write operation.
79 (121)	RAM card error	-	RAM card is not installed.
7A (122)	RAM card error	-	A ROM card is installed.
7B (123)	RAM card error	-	A different RAM card is installed.
7C (124)	RAM card error	-	A write operation is performed in the RAM card which has already some data.
7D (125)	RAM card error	-	A read operation is performed in the empty RAM card.
7E (126)	RAM card error	-	Write protect switch is on in the RAM card.
7F (127)	RAM card error	-	The other error. (Abnormal condition)

NOTE: The number of shown in the () is the operation error code number after code E56- of system error.

Error Code	Nature of error	Function code	Details
80 (128)	C-in line controller error	81,83,84,85,86	Reset error of C-In line controller
81 (129)	C-in line controller error	81,83,84,85,86	Receive interruption operation is not finished.
82 (130)	C-in line controller error	81	Initial error of controller. The ID No. and start up operation is not finished yet.
83 (131)	C-in line controller error	82,83,84	Token signal can not be received by some reason. Or, there are no machine in C-In line cable.
84 (132)	C-in line controller error	-	Transmission size is over.
85 (133)	C-in line controller error	83,85	The transmission is not finished by a noise or some reasons.
86 (134)	C-in line controller error	81	The same ID No. exists on the C-In line cable.
87 (135)	C-in line controller error	-	The machine does not enter the network caused a mismatch of the baud rate or some reasons.
90 (144)	C-In line protocol error	83,84,85,86	NCB (Network control block) open parameter mismatch or memory over error
91 (145)	C-Inline protocol error	-	NCB open error (Not used)
92 (146)	C-Inline protocol error	-	NCB close error (Not used)
93 (147)	C-Inline protocol error	-	NCB connection error (Not used)
94 (148)	C-Inline protocol error	-	NCB operation check error (Not used)
95 (149)	C-Inline protocol error	-	Header packet not received error (Not used)
96 (150)	C-Inline protocol error	-	NCB connection error (Not used)
97 (151)	C-Inline protocol error	-	NCB non connection error (Not used)
98 (152)	C-Inline protocol error	-	NLib(Network library) parameter mismatch error
99 (153)	C-Inline protocol error	-	Transmission retry over error
9A (154)	C-Inline protocol error	-	Reception retry over error
9B (155)	C-Inline protocol error	83,84	Packet block number mismatch error
9C (156)	C-Inline protocol error	83,84	NCB does not exist. Or, the NCB application software is stopped.
9D (157)	C-Inline protocol error	83,84	Reception memory over error.
9E (158)	C-Inline protocol error	83,84	Transmission retry over error. (Time over)
9F (159)	C-Inline protocol error	83,84	The receprion complete packet is not returned from terminal.

NOTE: The number of shown in the () is the operation error code number after code E56- of system error.

Error Code	Nature of error	Function code	Details
A0 (160)	C-Inline protocol error	-	Reception application program is busy at the other terminal.
A1 (161)	C-Inline protocol error	83	The ID No. does not exist in the network.
B0 (176)	XMODEM protocol error	-	DSR signal does not turn on even ER signal turns on at the open time.
B1 (177)	XMODEM protocol error	-	An abnormal data is received.
B2 (178)	XMODEM protocol error	-	Trigger packet is not received.
B3 (179)	XMODEM protocol error	-	ACK packet is not received.
B4 (180)	XMODEM protocol error	-	NAK transmission over error.
B5 (181)	XMODEM protocol error	-	DSR signal turns off. (The line connection is terminated.)
B6 (182)	XMODEM protocol error	-	CAN (Cancel) data is received.
B7 (183)	XMODEM protocol error	-	EOT (End of text) data does not receive.
B8 (184)	XMODEM protocol error	-	CD signal does not turn on. (The connection is not completed.)
C0 (192)	Resource error	-	QCB is not existed. (QCB=Que control block=Send /Receive buffer control area)
C1 (193)	Resource error	-	QCB buffer area is already existed.
C2 (194)	Resource error	-	QCB buffer area is already released.
C3 (195)	Resource error	83,84,85,86	TMCB (Timer control block) is not existed.
C6 (198)	Resource error	83,84,86	Reception time out error.

NOTE: The number of shown in the () is the operation error code number after code E56- of system error.

5. ERROR CODE LIST

Error codes appear on the display whenever you make a mistake during operations.

Error Code	Meaning	Action	Dot Display
E01	Operation without entering PROGRAM, X_1, or X_2/Z_2 mode secret code (PASSWORD).	Enter secret code (PASSWORD).	PASSWORD
E02	Registration without entering clerk secret number.	Enter clerk secret number.	ERR CLK#
E03	Incorrect initialization or unit lock clear operation.	Perform initialization or unit lock clear operation again.	START
E04	MODE switch position changed before finalization.	Return MODE switch to original setting and finalize operation.	ERR MODE
E05	Operation error. (One shot error)	Operate next correct operation.	OPE ERROR
E06	Clerk button pressed before finalization of a registration being performed under another clerk button.	Press the original clerk button and finalize the registration before pressing another clerk button.	ERR CLERK
E07	Receipt ON/OFF button setting changed before finalization under another setting.	Return receipt ON/OFF switch to its original setting and finalize registration.	RECEIPT SW
E08	Registration without entering number of customers.*	Enter number of customers.	ERR CUST
E09	Finalization of a transaction attempted without registration of the tax.*	Register the tax.	ERR TAX
E10	Finalization without confirmation of subtotal.*	Press [SUBTOTAL] key.	ERR ST
E11	[FS/TEND] key pressed without first pressing the [FS/ST] key.	Press the [FS/ST] key.	ERR FSST
E12	Two consecutive transactions attempted in refund mode.*	Switch to another mode and then back to RF mode for next transaction.	RF MODE
E13	Validation not performed.	Perform validation operation.	VALIDATION
E14	READ/RESET operation without declaration of money in drawer.*	Perform money declaration.	DECLARE
E16	Journal memory data is not found.	Input correct date and consecutive No.	NOT FOUND
E17	Registration while ECR drawer is open.*	Shut drawer before registration (when optional compulsory drawer is used.)	DRAWER
E18	Change amount exceeds preset limit.*	Re-enter amount tendered.	CHANGE OVER
E19	Contents of drawer exceed programmed limit (sentinel function).*	Arrange to have contents of drawer picked up by management.	INDW OVER
E20	Slip printing not perfomed.*	Perform slip printing operation.	SLIP

Note: (*) These errors will only be generated when the respective functions are programmed as being compulsory or prohibited.

Error Code	Meaning	Action	Dot Display
E21	Actual stock quantity less than or equal to minimum stock quantity.	Perform stock maintenance.	MIN. STOCK
E22	Negative value for actual stock quantity.	Perform stock maintenance.	- STOCK
E23	Check endorsement printing not performed.*	Perform check endorsement printing operation.	CHK ENDORSE
E24	Scale data cannot be read due to data variation or scale is turned off.	Press [C] key or turn the scale on.	ERR SCALE
E25	Finalize operation attempted without entering amount tendered.	Enter amount tendered.	TENDER
E26	Memory allocation exceeds total ECR RAM capacity.	Reallocate without exceeding RAM capacity.	MEMORY OVER
E27	No thermal printer paper.	Add thermal printer paper.	NO PAPER
E28	A different clerk operated the ECR without pressing [HOLD] key.*	Press [HOLD] key before signing in.	HOLD
E29	Attempt to register without printing a check.*	Finalize the transaction by printing a check with the slip printer.	CHK PRINT
E30	Attempt to register without entering a check number.	Enter a check number	ERR CHECK#
E31	Attempt to register without entering a table number.	Enter a table number first then register.	ERR TABLE#
E32	The detail memory of the check tracking system is full.	Use the NB key to finalize the transaction of the check.	MEMORY FULL
E33	Attempt to use the same check number which already exists.	Finalize transaction with the number or use a different check number.	OCCUPIED
E34	Attempt to proceed operation with entering a non-existing check number.	Re-enter an existed check number then perform operation.	NOT FOUND
E35	A different type of RAM card is used.	Use proper type of RAM card.	ERR CARD
E36	Attempt a registration without entering number of condiment.*	Register number of condiments.	CONDIMENT
E37	Attempted to register check tracking items without print.*	Finalize transaction with printing all the check tracking items.	GUEST RCT
E38	Journal memory data read error.	Hard error. Check RAM chip.	J-MEMO ERR
E39	Journal memory full.	Liquidate the ECR (issuing Z report).	J-MEMO FULL

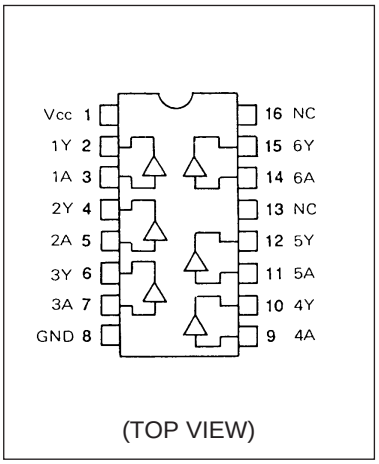
Note: (*) These errors will only be generated when the respective functions are programmed as being compulsory or prohibited.

Error Code	Meaning	Action	Dot Display
E41	Kitchen printer down error.	Check the power of the kitchen printer.	KP ERROR #n
E42	Kitchen printer paper near end error.	Change the roll paper to new one.	KP PAPER #n
E44	Kitchen printer buffer error.	The over data is printed on the receipt paper automatically.	KP BF OVER
E45	Separate Item error.	Input the correct item checking by the Slip/ Guest receipt.	INCMPLT MENU
E46	Time attendance memory full error.	Make Z report of time attendance.	MEMORY FULL
E47	The number of clerk for Time Attendance is not found.	Input the correct number for Time Attendance.	NOT FOUND
E48	The number of clerk for Time Attendance is already entered.	Input the correct number for Time Attendance.	OCCUPIED
E49	A data exists in the data collection memory area.	Clear the data in the collection memory area.	TENDER
E50	P/C is down.	Start up the P/C again.	**PC STOP**
E51	IDC buffer near end/ full error.	Make Z operation od IDC area.	IDC FULL
E52	Kitchen printer buffer (P/C side) full error.	The over data is printed on the receipt paper automatically.	KP FULL
E53	Kitchen printer print compulsory error.	Perform the kitchen printer print operation before the other operation.	ERR KP PRINT
E54	The check number is used.	Input the correct number of check number.	BUSY
E55	The same ID number exists in the net work.	Set the correct ID number.	DUPLICATE ID
E56-XXX	Net work system error. The number XXX is the diagnostic error code. Refer the error code list on page 20 ~ 23.	From the error diagnostic error code , perform the necessary action.	SYSTEM ERROR
E57	SA-3000 CPU's UPS is working.	Check the P/C (SA-3000) power failure.	NOT FOUND
E58	Hotel host P/C down error.	The communication error. The transfered data is lost. No operation is necessary.	PC/IRC ERROR
E59	ID number/ Baud rate change alarm.	First, set the ID No. & baud rate value to 0. Then, turn power off and on. Set the necessary value of the ID No. & baud rate.	ID/BAUD CORR

Note: (*) These errors will only be generated when the respective functions are programmed as being compulsory or prohibited.

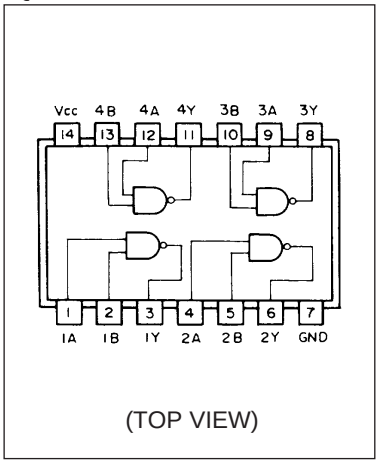
6. IC DATA

TC74HC4050AP



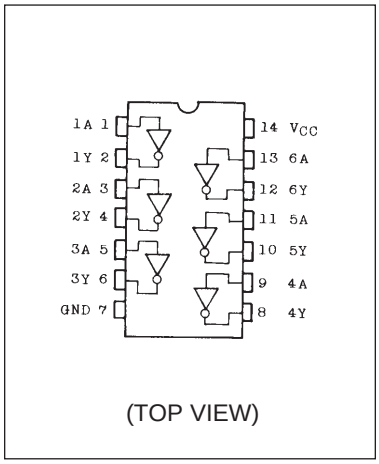
(TOP VIEW)

TC74HC00AP
QUAD 2-INPUT NAND GATE



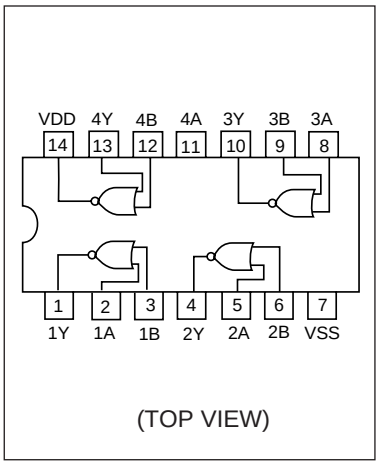
(TOP VIEW)

TC74HCU04AP
HEX INVERTER



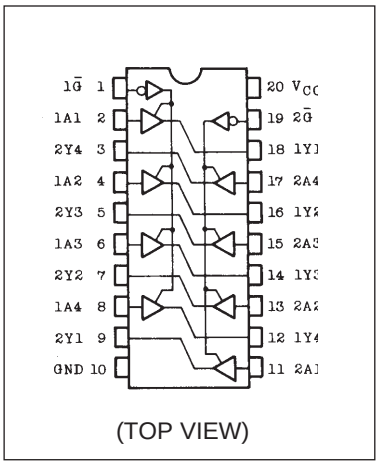
(TOP VIEW)

TC74HC02AP



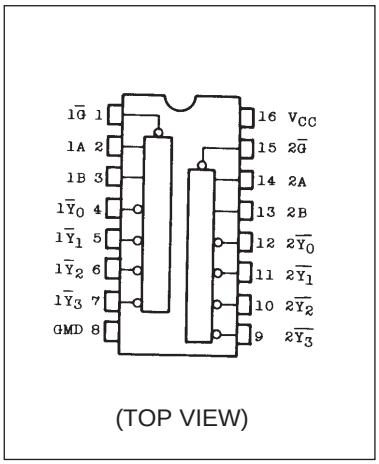
(TOP VIEW)

TC74HC244AP



(TOP VIEW)

TC74HC139AP



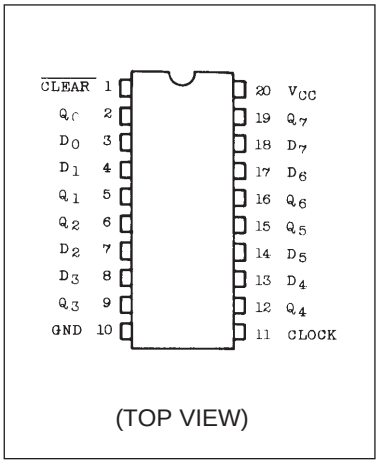
(TOP VIEW)

INPUTS			OUTPUTS				
ENABLE	SELECT						SELECTED
$\overline{G}$	B	A	$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	OUTPUT
H	X	X	H	H	H	H	NONE
L	L	L	L	H	H	H	$\overline{Y0}$
L	L	H	H	L	H	H	$\overline{Y1}$
L	H	L	H	H	L	H	$\overline{Y2}$
L	H	H	H	H	H	L	$\overline{Y3}$

X: Don't care

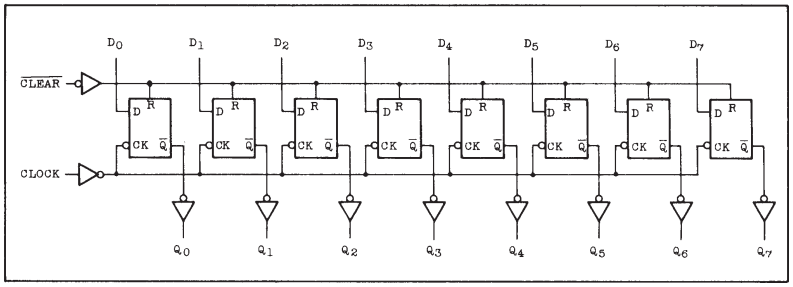
TC74HC273AP

OCTAL D-TYPE FLIP FLOP WITH CLEAR



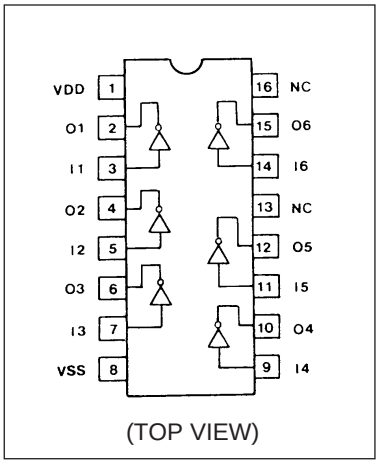
(TOP VIEW)

LOGIC DIAGRAM



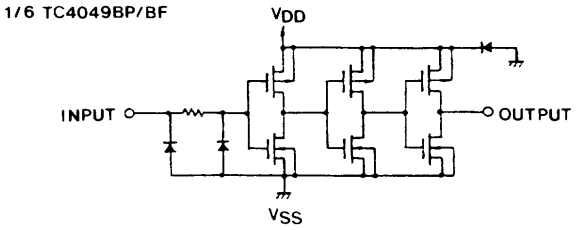
INPUTS		OUTPUT		
$\overline{\text{CLEAR}}$	D	CLOCK	Q	FUNCTION
L	X	X	L	Clear
H	L	↑	L	–
H	H	↑	H	–
H	X	↓	Qn	No change

TC74HC4049AP

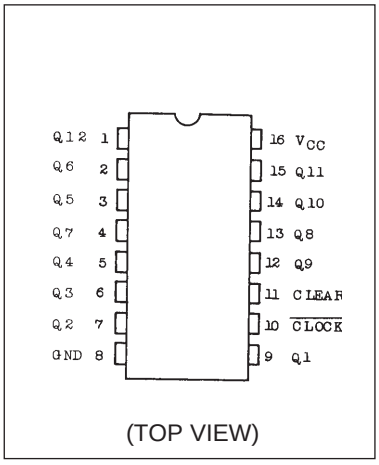


(TOP VIEW)

1/6 TC4049BP/BF



TC74HC4040AP

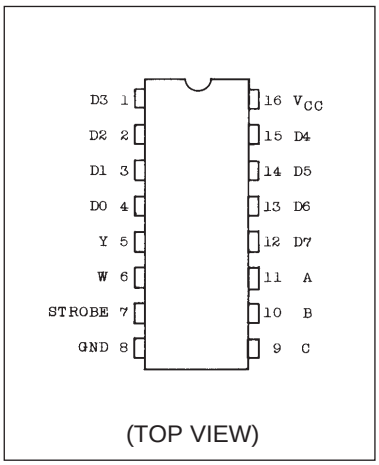


(TOP VIEW)

$\overline{\text{CLOCK}}$	CLEAR	OUTPUT STAE
X	H	ALL OUTPUTS = "L"
↑	L	NO CHANGE
↓	L	ADVANCE TO NEXT STATE

X : DON'T CARE

TC74HC151AP

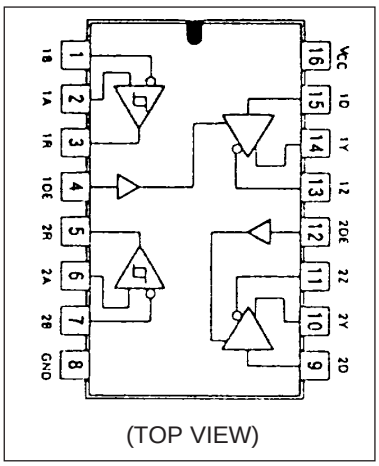


(TOP VIEW)

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	S		
X	X	X	H	L	H
L	L	L	L	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$

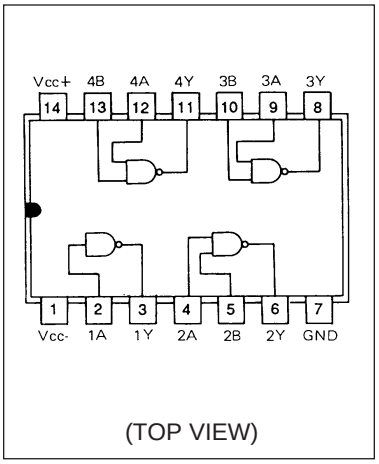
X: Don't care

SN751178N



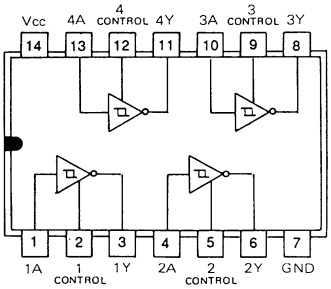
(TOP VIEW)

SN75188N



(TOP VIEW)

SN75189AN



(TOP VIEW)

7. PARTS LIST

N	Item	Code No.	Parts Name	Specification	Version	Q	M	FOB Japan N.R.Yen Unit Price	R	*
			I/O-PB-11 ass'y	E311890*1		1				
	IC7	2002 1330	LSI	UPD71051C		1			A	G
N	IC10	2006 0864	LSI	COM20020BIP		1			A	V
	D3	2310 9409	Zenner diode	RD5.1FB3		1	10		B	A
	X1	2520 1818	Ceramic oscillator	CST4.91MGW		1	10		A	A
N	X2	2590 1197	Ceramic oscillator	CSA20.00MXZ040		1	5		A	B
	RA2	2720 4376	Module resistor	MS1035F		1	20		C	A
	RA1	2730 0023	Module resistor	MS1036F		1	10		C	A
N	CA1	2845 0182	Module capacitor	CNB6X101K		1	10		C	A
	CN5	3500 1121	PCB connector	IMSA-9603S-16C		1	10		X	A
	CN3	3540 3918	Connector	HIF3FC-16PA-DSA		1			X	B
	CN2	3540 4279	Connector	B02P-XL		1	20		X	A
N	CN4	3540 4731	PCB connector	IMSA-9603C-24C		1	10		X	A
N	CN1	3612 0827	Connector	TCS5044-01-401		1			X	B
	F1,F2	3630 2844	Time lag fuse	TSC-0.5A		2	10		A	A
	F1,F2	3640 2331	Fuse holder	UF-0033		4	10		X	A
	IC17	2101 0162	MOS IC	TC74HC139AP		1			A	B
	IC1	2101 0243	MOS IC	TC74HC4049AP		1			A	B
	IC13	2101 0774	C-MOS IC	TC74HC151AP		1			A	B
	IC9	2101 0782	C-MOS IC	TC74HC273AP		1			A	B
	IC16	2101 0791	C-MOS IC	TC74HC4040AP		1			A	B
N	IC8	2101 1037	MOS IC	TC74HC244AP		1			A	B
	IC14	2105 1008	C-MOS IC	TC74HC00AP		2			A	A
	IC12	2105 1085	C-MOS IC	TC74HC02AP		1			A	B
	IC5	2105 1260	C-MOS IC	TC74HCU04AP		1			A	A
	IC4	2105 1463	MOS IC	TC74HC4050AP		1			A	B
	IC2	2111 2275	Bipolar IC	SN75188N		1			A	C
	IC11	2111 6238	Bipolar IC	SN751178N		1			A	G
	IC3,IC6	2113 0217	Bipolar IC	SN75189AN		2	5		A	B
N	D1,2,4,5	2315 2619	Diode	1SS142-T-77-T		4	20		C	A
	R25,26	2614 0013	Carbon film resistor	R-25-10K-J-T24-T		2	20		C	A
	R20,21	2614 0048	Carbon film resistor	R-25-15K-J-T24-T		2	10		C	A
	R1~11,19,24, 27~30,36	2614 0145	Carbon film resistor	R-25-100-J-T24-T		18	10		C	A
	R13~18,31, 32,35	2614 0234	Carbon film resistor	R-25-1K-J-T24-T		9	20		C	A
	R12	2614 0242	Carbon film resistor	R-25-1M-J-T24-T		1	10		C	A
	R22,23,33,34	2614 0706	Carbon film resistor	R-25-10-J-T24-T		4	10		C	A
	C6,21,24	2802 9931	Electrolytic capacitor	16RE3-100-T2-T		3			C	A
	C7	2807 1523	Electrolytic capacitor	35RE3-100-T2-T		1	20		C	A
	C2,5,10	2818 0365	Ceramic capacitor	RT-HE50TKYB102K-T		3	20		C	A
	C4,14~19,26, 27,30,35,37	2818 0446	Ceramic capacitor	RT-HE40TKYB101K-T		12	20		C	A
	C3,36	2818 3208	Ceramic capacitor	RT-HE50TKCH330J-T		2	20		C	A
	C1,22,25	2820 3098	TF capacitor	ECQ-V1H-104-JZ3-T		3	10		C	A
N	C12,13,20,28, 31,32,34	2825 0364	TF capacitor	ECQ-B1H103JF3-T		7	20		C	A
		4308 0976	PCB E-I/O-PB-11	E211627-1		1			X	H
			Others							
		6231 9707	FG wire sub ass'y A	E310996A-15		1	20		X	A
		6245 5330	FFC joiner G-PB-9	E411511B-7		1			A	B
		6245 5340	FFC joiner H-PB-9	E411511B-8		1			A	B

Notes: N – New parts
M – Minimum order/supply quantity

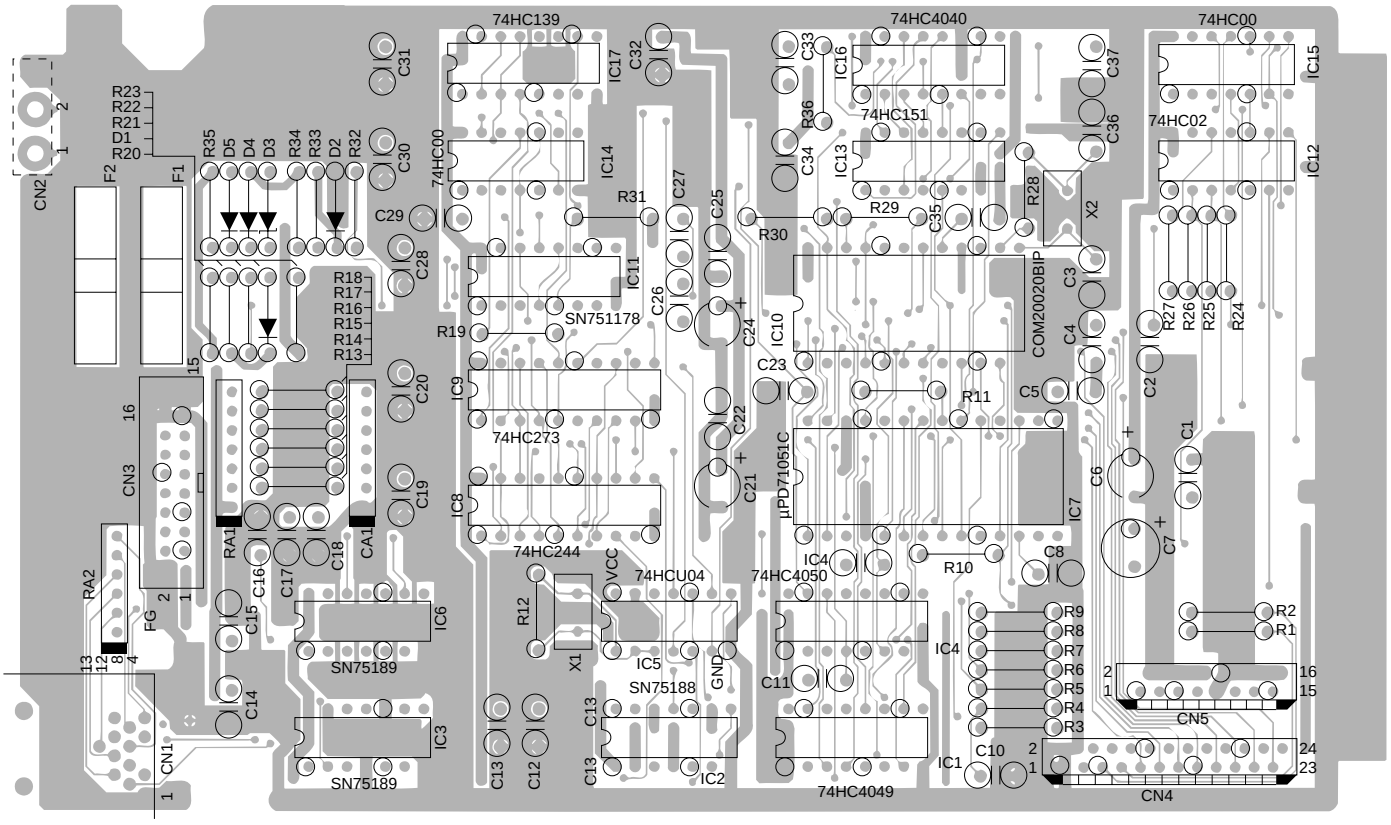
R-Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

N	Item	Code No.	Parts Name	Specification	Version	Q	M	FOB Japan N.R.Yen Unit Price	R	*
		3540 3924	IN-LINE connector kit	XLP-KIT-2		1			A	B
		5111 1648	Screw	3X8 ZMC-3		1			X	A
		5112 0124	Screw with washer	3X8 ZMC-3.....		2	20		X	A
		5550 1459	Locking spacer	SPLS-10		2	20		X	A
		6221 4285	Earth metal sub ass'y	E411552*1		1			X	C
N		6246 0740	Name sheet EI/O11	E411873-18		1	5		X	B
		2600 2516	Carbon film resistor	R-25-100-J		2	20		X	A

Notes: N – New parts
M – Minimum order/supply quantity

R-Rank A : Essential
B : Stock recommended
C : Others
X : No stock recommended

8. PCB LAYOUT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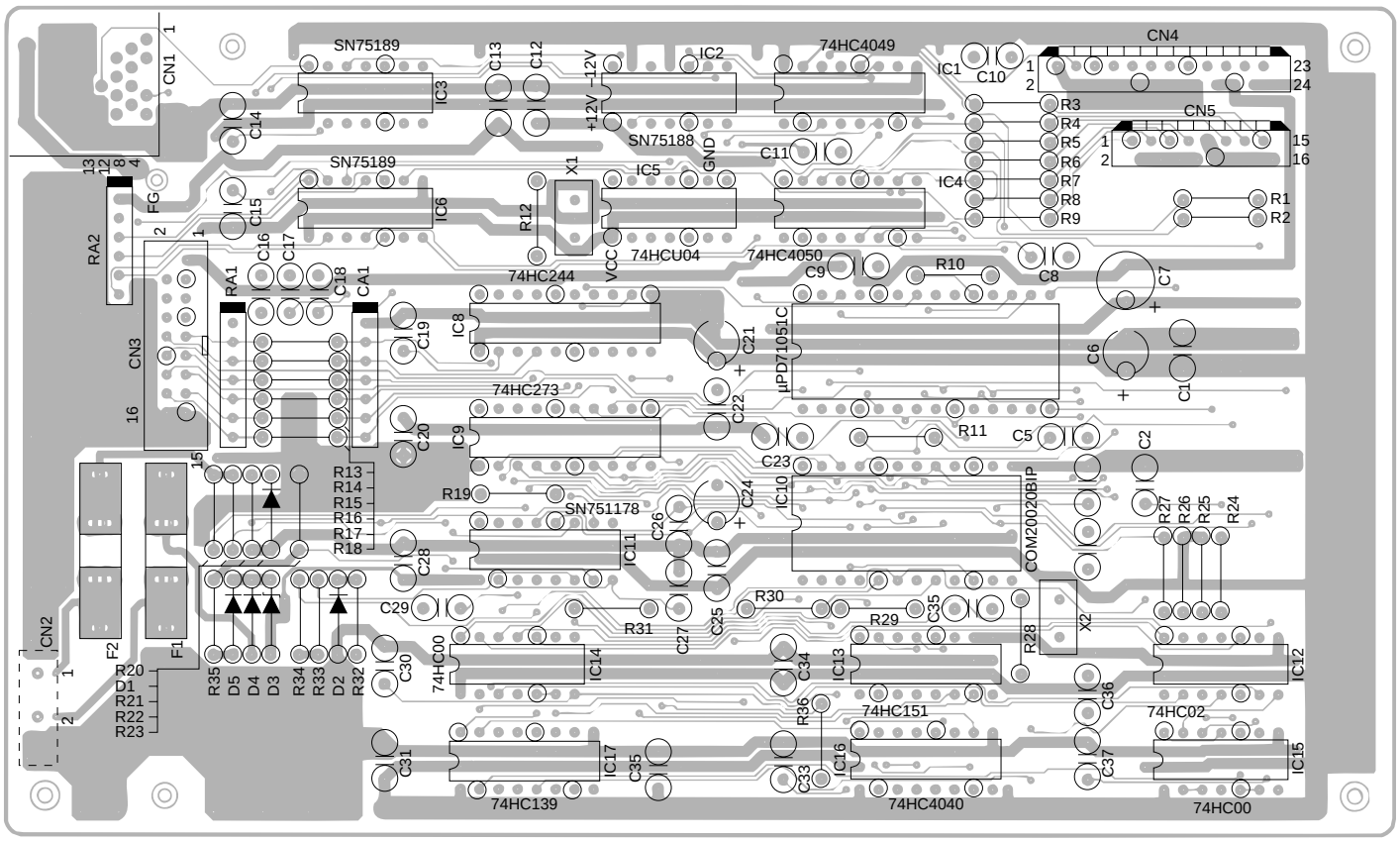
74HC151
74HC02
74HC00
SN751178
74HC273
74HC244
74HCU04
74HC4050
SN75189
SN75188
74HC4049
COM20020BIP
µPD71051C
CN1
CN2
CN3
CN4
CN5
RA1
RA2
FG
GND
VCC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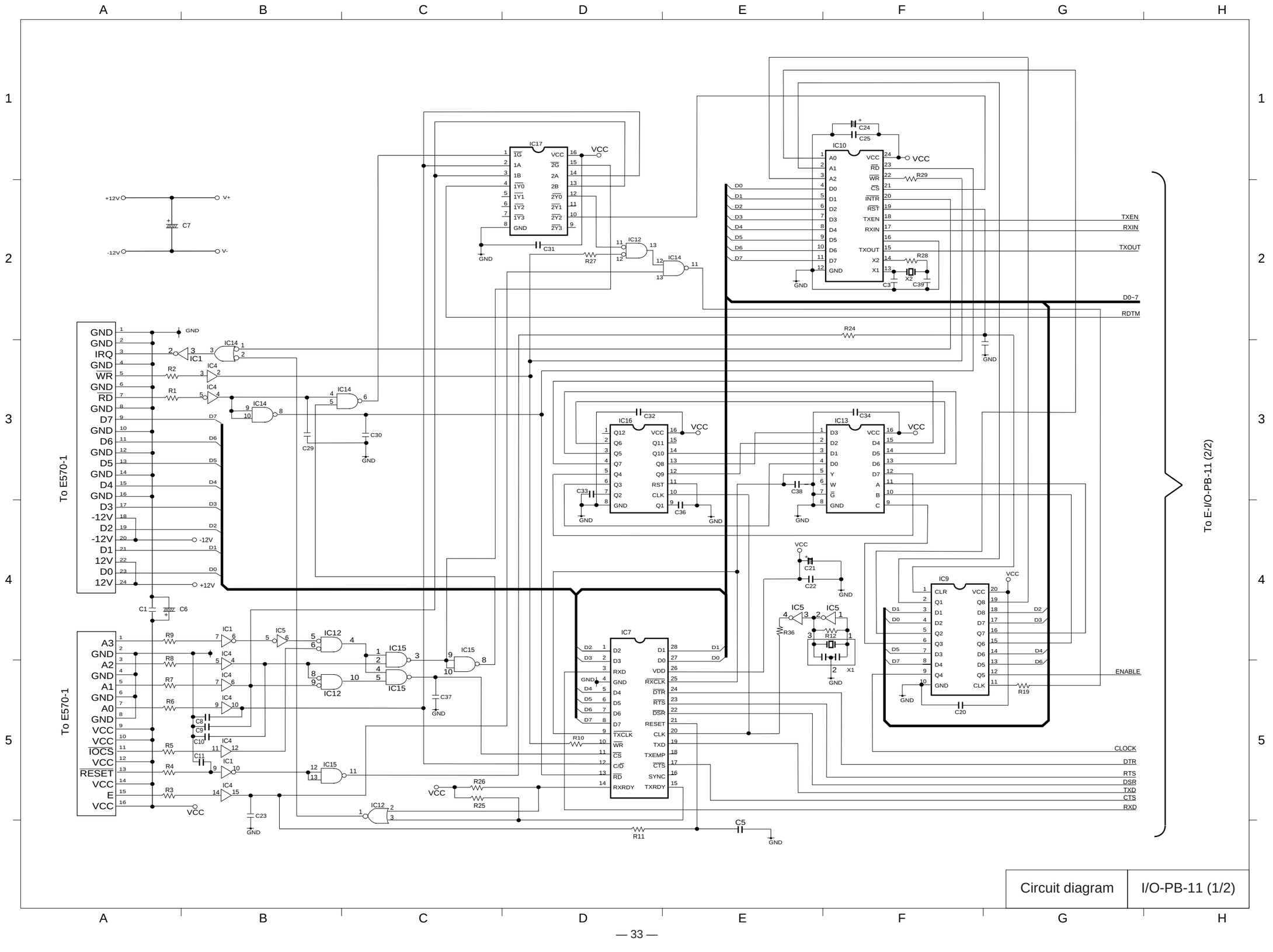
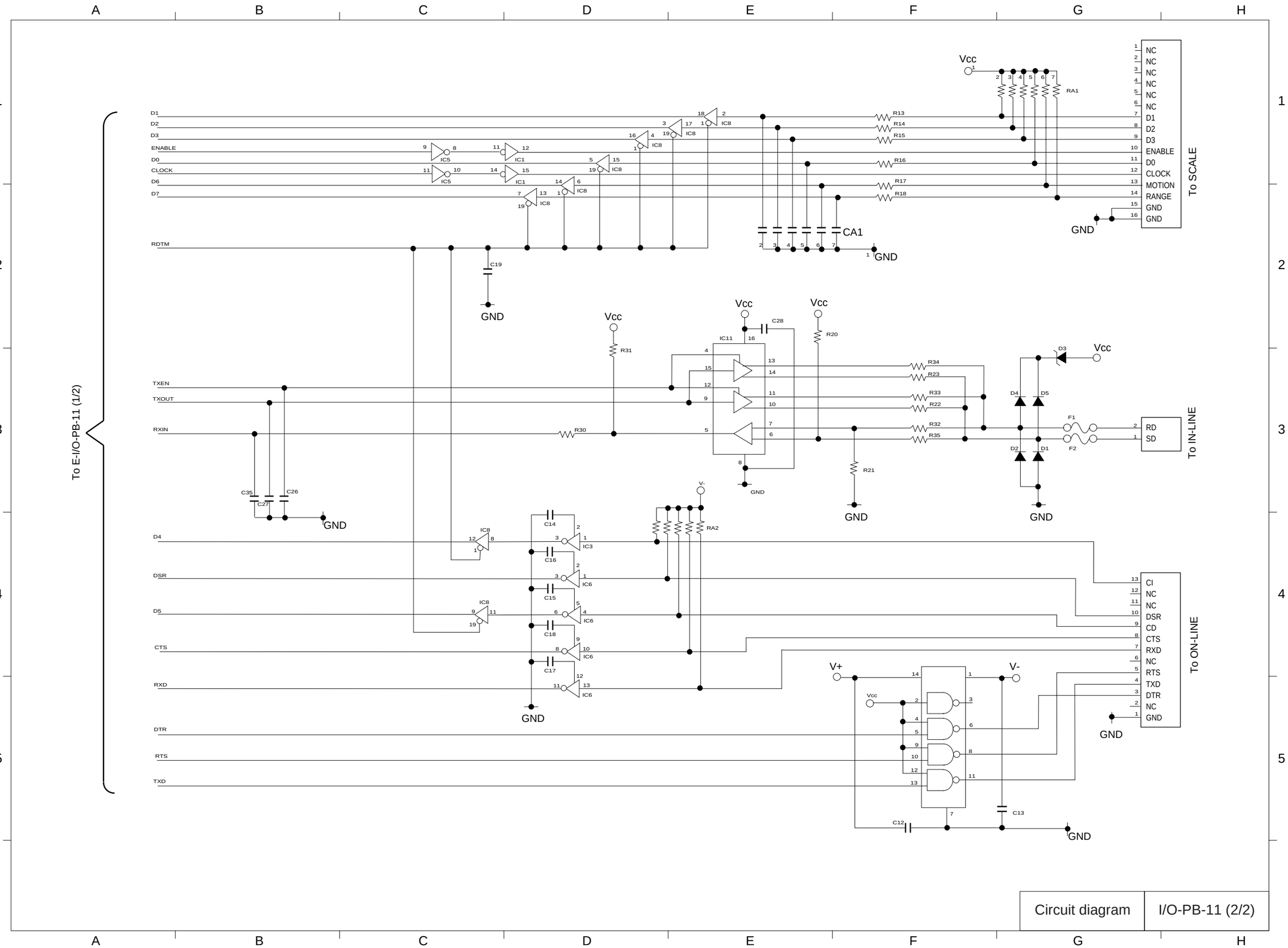
74HC4040
74HC00
74HC151
74HC02
74HC00
SN751178
74HC273
74HC244
74HCU04
74HC4050
SN75189
SN75188
74HC4049
COM20020BIP
µPD71051C
CN1
CN2
CN3
CN4
CN5
RA1
RA2
FG
GND
VCC
+12V
-12V

9. CIRCUIT DIAGRAM



Circuit diagram	I/O-PB-11 (1/2)



Circuit diagram	I/O-PB-11 (2/2)

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